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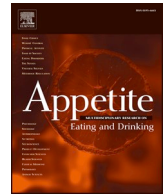
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Changing food preferences among a former hunter-gatherer group in Namibia

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ABSTRACT

The purpose of this study was to identify, describe and conceptualize the present drivers of food choices and preferences of the Khwe San indigenous peoples by considering influences of their historical and cultural contexts. Data were collected in Eastern Bwabwata National Park in Namibia using a range of qualitative methods: semi-structured and structured interviews and free listing. The various drivers of food choices have been clustered into four levels of the ecological conceptual framework.

Key factors, found to be driving participants' food choices, were the following: taste, hunger, health, familiarity and body satisfaction at the individual level; culture and food taboos at the social level; access to food and food storage at the physical level, and; cost and seasonality at the macro level. Many of these factors are directly related to food insecurity and previous experiences of hunger.

Current preferences towards traditional foods existed but were not prevailing among all the participants. Interviews with the elderly revealed the historical context of the increasing exposure to modern foods and a contested access to traditional foods and traditional knowledge transmission. Our findings exposed some substantial gaps in the nutritional knowledge of the Khwe that need consideration by future health promotion strategies along with the current perceptions of local food choices. Ensuring access and promoting sustainable management of traditional foods would not only contribute to the health of the Khwe people but also help to maintain a nutritional safety net in their current situation of extreme poverty.

1. Introduction

The San in Southern Africa possess a vast amount of knowledge and cultural practices about traditional wild foods that have sustained these nomadic and semi-nomadic hunter-gatherer groups for millennia (Bieseke & Royal, 1997; Dain-Owens, Kemp, & Lavelle, 2010). In the recent decades, most San groups have been banned from practising subsistence hunting and severely restricted in their natural resource use, instead encouraged to participate in wage economies and agricultural production, while also provided with handouts of maize meal (Dieckmann, Thiem, Dirkx, & Hays, 2014; Hitchcock, 2012). However, the consequences of the livelihood changes and settled lifestyles have led to major dietary transitions (Popkin, 1994), with detrimental effects on the San's nutritional status and diet quality (see: Kirchengast, 1998; Fernandes-Costa et al., 1984; Heim & Paksi, 2019).

Diet quality is strongly influenced by the food environment (Heim, 2019; Larson & Story, 2009; Morland, Wing, & Roux, 2002; Popkin, Duffey, & Gordon-Larsen, 2005), but nutrient intake also depends

largely on the food choices of the individuals. A number of models have been developed in high-income countries to conceptualize the different dimensions of dietary behaviour and food choice decisions (Furst, Connors, Bisogni, Sobal, & Falk, 1996; Krebs-Smith & Kantor, 2001; Sobal & Bisogni, 2009), however food choice studies in low-income populations, especially in rural settings, remain scarce. That said, the ecological framework from Story, Kaphingst, Robinson-O'Brien, and Glanz (2008) has recently been applied in reviewing drivers of dietary behaviours in African urban settings (Gissing, Pradeilles, Osei-Kwasi, Cohen, & Holdsworth, 2017; Holdsworth & Landais, 2019).

In the above-mentioned ecological model, the various conditions and environments that drive food choices have been situated into four embedding clusters (Story et al., 2008). The basic level at which factors influence what to eat is at the individual level - attitudes, preferences, biology, and knowledge for example. These are further embedded within social, physical and macro-level environments. The social environment includes social norms and practices and the impacts of interactions within the social structure of a person's life. Meanwhile, the

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physical environment refers to the characteristics of the localities, where people acquire and consume food. Finally, the macro level is where factors such as policies, marketing, food prices are considered. Gissing et al. (2017), in their review of studies on food choice determinants found individual-level factors to be the primary measured influencers among women in the urban African setting, while the measurements of social, physical and macro-level drivers were largely missing from the literature.

In the present study, we have examined food choice factors according to the ecological conceptual framework to gain an understanding of how former hunter-gatherer San people make their decisions about food in an African rural setting. This paper also reveals considerations about so-called 'good foods', contributing to the existing body of work and providing further investigation on the rationale of food choices. In cases such as this where livelihoods are highly unstable, it is especially important to examine the influences on diet quality in order to better inform and guide future malnutrition eradication and health promotion strategies.

To our knowledge, no study has to date looked at the food perceptions of contemporary San, nor examined the food preferences related to their current diet. Our intention was thus to open this discussion by incorporating the influence of the historical and cultural backgrounds in which the current food choices are made. For that reason, the purpose of this study is two-fold: i) to explore the main historical and cultural factors that shape current dietary behaviours of the Khwe San community based on elderly members' past experiences and present realities and ii) to identify, describe and conceptualize the present drivers of food choices.

2. Methods

2.1. Study context

Data collection took place amongst the Khwe San, a former hunter-gatherer community living in Bwabwata National Park (BNP) East in Namibia. Today the Khwe are settled in villages but continue to gather wild fruits, roots and leaves in the mostly broad-leafed Kalahari woodland vegetation inside the multiple use area of the National Park. Community based natural resource management regime has long been promoted inside BNP, but the actual administration and management of the park remained top down, state-led conservation approach, with minimum involvement of the communities in the decision making of resource management. The core conservation areas in BNP are reserved for wildlife and tourism, and local people are not permitted to enter. Subsistence hunting of any kind is banned since 1968 (Rousset, 2003), though locals benefit somewhat from a commercial trophy hunting concession in the park. At the time of data collection, the Namibian Defence Force started their operation in BNP against illegal elephant poaching, and the inhabitants were ordered to remain within a 3-km radius of their respective village. The usual food gathering trips thus became impossible, and the strict regulation lasted during the entire fieldwork period.

BNP is located in the wettest part of the country, yet it is still subject to frequent and severe droughts. The approximately 1600 Khwe living in the Eastern part of the BNP have no access to rivers. Rainfed small-scale crop farming of predominantly maize is practised, irregularly, by some 50 to 60 farmers, and yields are very small. Food shortages are frequent, and the majority of the community is utterly reliant on the government's social welfare and food distribution programs. However, the monthly governmental food aid deliveries to the villages are highly inconsistent, and sometimes delays of several months were experienced by the households (Heim, 2019). Sporadic employment both inside and outside the villages does exist but provides little for economic or food security (Paksi & Pyhälä, 2018). The larger villages have outsiders' run shebeens (unlicensed establishments, also referred to as local shops) that sell alcohol and non-perishable food items. Once a month, mobile

shops sell modern food items in the villages, while the closest market town in the area is 160 km away (Katima Mulilo).

2.2. Study design

Participants' perceptions associated with dietary behaviour within the traditional and contemporary food systems were collected using a multi-method qualitative design. The study began with an initial ethnographic research approach to build trust with the local community members and establish a working relationship with the research assistants. Throughout three extended periods of fieldwork (five months each) between 2016 and 2018, two local field assistants helped with translations, sampling, arranging interviews, and interpreting data.

During the initial phase of the research, the first author familiarized herself with the vocabulary of the food domain and explored how the Khwe in BNP interpret, structure and characterize the food domain. In the second extended fieldwork period (and for the purposes of this paper), in-depth interviews were conducted with elderly men and women about their past and present diet and lifestyle. People often make food choices based on lived experiences influenced by the local history and culture (Furst et al., 1996; Rozin, 1998), therefore elderly were chosen for this study as key informants, in order for us to learn about important past experiences. In addition, we collected data on food choices and food preferences by means of individual structured interviews (including youth) of comparison and free listings (Bernard, 2005). Participant observation was carried out throughout the entire fieldwork period, enabling us to triangulate the data.

2.3. Sample

Our sample consists of adult individuals from three larger villages – each with 200–400 inhabitants – and three small villages, the latter located in the vicinity of the bigger villages and consisting of anywhere between 20 and 80 inhabitants. The nearest market town to any of these villages was at a distance of 2–3 h by car.

Our key informant interviews ($n = 33$) with elderly women and men (aged 50–87) were undertaken in all six villages, and adult participants for the structured interviews – including comparison ($n = 55$) and free listing exercise ($n = 69$) – were sampled by systematically selecting every third house in the village (Table 1). Data were recorded in the study journal and, whenever practical, voice-recorded with the participants' approval.

2.4. Ethics

Throughout the research, we adhered to standard ethical procedures of Free Prior and Informed Consent with each individual. It was made clear that participation in the study was entirely voluntary: subjects were explained their right to choose not to participate and/or to withdraw from the study at any point, without any consequences. According to the ethical principles of research requirements of the Finnish Advisory Board on Research Integrity, the present study did not require an ethical statement, seeing it did not involve any methods or procedures listed by the Board as requiring a thorough and in-depth ethical review. The ethical review request for this study was therefore waived by the Ethical Review Board in the Humanities and Social and Behavioural Sciences at the University of Helsinki.

2.5. Implication of positionality on data collection and interpretation

The positionality of the first author (who in this case also collected the data) inevitably has certain impacts on the data collection process and subsequent data interpretation. As a white, western childless female in her thirties portraying locally non-female characteristics (e.g. wearing trousers, driving a car, etc.), made it challenging to overcome cultural distances in the beginning, especially with Khwe women, who

Table 1

Number of Khwe study participants per socio-economic variable and data collection method.

	Key informant interviews	Comparison interviews	Free listing interviews
Total participants	33	59	66
Age (years):			
18–29 (youth)	0	35	29
30–49 (middle aged)	0	11	14
50+ (elderly)	33	13	23
Gender:			
Male	16	21	32
Female	17	38	34
Education level:			
No schooling	29	15	24
Primary school (gr. 1–7)	4	17	23
Secondary and above (gr. 8+)	0	27	19
Employed:			
Yes	10	11	13
No	23	48	53
HHD ^a monthly per capita income (NAD ^b):			
0–350	18	37	43
351–700	10	16	17
701+	5	6	6

^a Household.

^b Namibian Dollar.

were already wary with visitors. Trust is a crucial element in the relationship with the community members, and for this study was earned through learning basic expressions in local language, spending time with community members, applying creativity in research methods, maintaining communication with villagers during the entire research period (even from overseas, via internet), and most of all by returning to the villages several times, even after longer periods of absence. This study was conducted after a preliminary stint of five months of ethnographic research, during which some degree of cultural competence had already been acquired. To minimize the impacts of the researcher's positionality, methods of triangulation (participant observation, unstructured and structured key informant interviews) were applied, and frequent discussions were held about data interpretation with the local research assistants.

2.6. Methods of data collection

Working in a very distinct linguistic and cultural setting, the most frequently used food choice questionnaire (FCQ) by [Steptoe, Pollard, and Wardle \(1995\)](#) has proved to be inappropriate. The questionnaire is limited in its application in non-western settings, as it does not seem to capture the nuances of specific cultural settings ([Milošević, Žeželj, Gorton, & Barjolle, 2012](#)). To minimize the gaps, the application of alternative methodological approaches was suggested by [Freedman \(2016\)](#). Thus, we looked for innovative ways to reveal salient influencing factors of food choice and to contextualize those. First, elderly people were interviewed about traditional foods consumed in the past, diet and lifestyle changes, significant events that had affected what they ate, knowledge and skills for food obtainment and processing, health and illness, as well as taste preferences. All the interviews with elders were undertaken in Khwedam, with simultaneous translation to English by the local research assistants.

During these interviews, elders were also asked if any of the food items that they had consumed in the past have been replaced. The re-occurring food item pairs mentioned by the elderly were then used later in the comparison interviews. After pilot testing the pairs of traditional food items and their modern counterparts, 12 pairs were selected ([Table 3](#)), each of them commonly known and consumed.

During the following stage of fieldwork, we conducted structured

comparison interviews. We gave each of the participants two familiar food items (randomizing the order of the presented food items in the pairs each time), and we asked the participant which item he or she prefers and why. By asking the reasons behind their choices, we were able to gain a deeper insight into how community members explain and contextualize their food choices in the present time.

To find out more about local perceptions of food choices, we carried out free listing exercise with 69 community members, asking them to list foods that he or she considers to be “good” food. When listing the foods, the participants were asked after each item to give reasons for listing it. In this way, we were able to obtain both attributes about food types as well as personal preferences and their underlying reasoning.

All the questions were pilot-tested in the study area and, where necessary, reformulated until the appropriate wording was found in the local language and cultural setting.

2.7. Data analysis

After the fieldwork, the English versions of the elders' interviews were transcribed and thematically analysed using Atlas.ti. Emerging themes were examined following an inductive approach. The results of these interviews provided an important background for designing the next stages of the field method.

The data from the structured comparison interviews were also analysed thematically. The analysis was started by reading the transcribed reasoning for food choice, then through an iterative coding process, we assigned the text for each food choice to one or more factors. The described coding process was guided by an approach that was both inductive and deductive. The deductive process was informed by the ecological model of [Story \(2008\)](#) and by the findings of [Gissing et al. \(2017\)](#) who used the model for accumulating the drivers of food choices in an African setting. Additional inductively assigned codes were informed by the specific local context. Finally the factors were grouped into the four levels of the ecological model. In the ecological framework cultural norms and values were categorised under macro-level sector, yet in our analysis we are discussing culture-related influences under social factors because cultural norms and practices are subjects to change and profoundly influenced by kinship.

Free lists of “good” foods were analysed both quantitatively and qualitatively. We used AnthroPac software ([Borgatti, 1996](#)) to identify the most salient food items – i.e. items mentioned early on and found on a significant proportion of the free lists. We also carried out a thematic analysis of the participants' reasoning in agreement with what we described above, and we incorporated these findings to the ecological model.

3. Results

3.1. Lifestyle, dietary transition and changes in cultural norms

Based on the interview data collected from the elders, four primary themes emerged: (1) description of lifestyle and food of their younger years (2) factors (historical, environmental, political and cultural) that contributed to a changed diet; (3) challenges of food procurement in the current day and age, and (4) drivers of contemporary dietary choices ([Table 2](#)). Each of these is presented in detail below.

The elders characterized the traditional lifestyle of their youth as a time of general abundance of food, both in terms of game meat and wild plants food. Freedom of mobility was mentioned by almost every respondent. Gender roles were quite defined, with women being responsible for veld foods (the South African term for foraged bush crops), while men for hunting game meat. Despite the abundance in food, three respondents described these early years as difficult, where hunger was experienced during seasons when there was very little to eat in the bush. Farming was also regarded as part of a traditional lifestyle. While some elders described their families integrating millet

Table 2Summary of main emerging themes with supporting statements^a by Khwe elders in Bwabwata NP East, Namibia.

Lifestyle and food of the early years (youth)	<p>Abundance of bush foods in the past:</p> <p>“In the past, veld foods were bearing every season, they were plenty and from all kinds. Even the wild animals, we could eat them often and were not finished. If you were hungry, you could just go into the bush and look for food.” (Female, 76)</p> <p>“In the past, we collected food from the bush and also did farming. Life that time was good.” (Male, 88)</p> <p>Traditional practices</p> <p>“We were hunters and gatherers, this we have inherited from our parents.” (Male, 71)</p> <p>“Our elders were using careful instructions, but today our people are not following the rules. I can just go and grab the food at any time.” (Male, 50)</p> <p>Hunger in the past “In the past, if you didn't get anything by hunting or gathering, you might die from hunger, especially when it was a dry year.” (Female, 68)</p> <p>Health</p> <p>“In the past, people were fit and strong, we were eating very nice foods from the bush. These foods were not giving us diseases. Nowadays, people are dying too much.” (Female, 64)</p>
Factors leading to a changed diet	<p>Changes in the physical environment</p> <p>“In the past, we ate the stem of the palm, but nowadays we don't eat it, because it is very far.” (Male, 51).</p> <p>“Today is that people are lighting fires not in the appropriate season. For example, <i>tcinya</i> is not bearing this year, because it was burnt.” (Male, 64)</p> <p>Historical context</p> <p>“Previously we could move freely and we were only used to veld foods, but when the SADF came, they supplied us with modern foods and then most of our kids have forgotten about veld foods.” (Female, 58)</p> <p>Changes in Food Environment</p> <p>“The best hunters already died, and the forest is also closed from us. There is no more meat to eat for us nowadays.” (Female, 76)</p> <p>“In this modern time, we still have traditional food, but not anymore the same way. We changed, we eat also from the shop.” (Male, 58)</p>
Challenges in “the modern time	<p>Loss of traditional skills and knowledge related to traditional food procurement</p> <p>“If my grandchildren want to eat soup of <i>qom</i>, I have to open them. The others know how to make the soup, but don't have the skills to open it.” (Female, 64)</p> <p>“This knowledge will go when I will be dying. I used to teach my grandson, but they are too lazy. They are interested only to put on themselves nice body lotion.” (Female, 83)</p> <p>“If they find honey, even if this is on an <i>umbe</i> tree, they are just cutting the tree down. Instead bringing there or making a latter and collecting the honey, no they will just cut. Our young people are not following our instructions.” (Male, 64)</p> <p>Sickness and food insecurity today</p> <p>“Life is very difficult in this moment of time. If they are rejecting us going into the bush, why are they not bringing us something? We need something to eat throughout the month.” (Female, 58)</p> <p>“The food is also giving us sickness. It is not good to eat everyday just maize meal without any relish. This makes our body weak and we fall sick.” (Female, 74)</p> <p>Denied access</p> <p>“In this modern time, the wild animals are for other people, not anymore for us. We don't know how everything got so strict.” (Male, 76)</p> <p>“There are lots of <i>ce</i> in the bush ripened, but we are scared to go, because of the army. We are just waiting for the government to bring us food.” (Female, 64)</p> <p>“We would need a balanced diet, eating maize meal with meat and fresh foods. In the bigger towns, there are butcheries, there they can buy a piece of meat easily. But here there is no butchery, only local shops that do not have meat.” (Female, 58)</p>
Food-related preferences in the modern time	<p>Convenience</p> <p>“Life nowadays is better than the life of previous days. Now we live in the same place and we get support and pension from the government.” (Female, 82)</p> <p>Taste</p> <p>“This time we are eating a lot of sweet things, and sweet is really good. At that time, we were eating bitter things, and we were suffering.” (Male, 65)</p> <p>“Some youngsters do not even eat <i>qom</i>, <i>tcwere</i> or caterpillar when they are served. They refuse it, they only want to eat modern foods.” (Female, 64)</p>

^a Recorded from in-depth interviews with Khwe elders.**Table 3**

Pairs of traditional and modern food items used in comparison interviews.

Food type	Traditional (number of times chosen)	Modern (number of times chosen)
Sweeteners	Wild honey (34)	Sugar (25)
Condiments	Tseu ^a -hull of the false mopane seed (46)	Tomato sauce (13)
Staples	Millet porridge (28)	Maize porridge (31)
Pulses	Dry beans (49)	Canned beans (10)
Oils	Kiara oil ^a -oil from the seeds of <i>Ochna pulchra</i> (22)	Sunflower cooking oil (37)
Root vegetables	Dinga ^a -tuber of <i>Dioscorea</i> sp. (30)	Potato (29)
Liquid foods	Qom soup ^a -soup from manketti nuts (38)	Soup from soup powder (21)
Beverages	Tcinya ^a -drink from <i>Diospyros chamaethamnus</i> (40)	Coffee (19)
Vegetables	Derere ^a -green leafy vegetable (44)	Cabbage (15)
Sweets	Jingere ^a -fruits of <i>Berchemia discolor</i> (39)	Processed candies (20)
Poultry	Free-range village chicken (41)	Shop chicken (18)
Meat	Buffalo meat (38)	Beef (21)

^a Local Khwedam names for the respective traditional food item.

Comparison		Free listing	
Cost (79), Seasonality (36), Food assistance programs (16), Freshness (4), Conservation policy (3), Food labels (2), Weather (1), Packaging (1), Safety (1)	Macro Level	Policy (7), Safety (4), Freshness (1), Seasonality (1)	
Access (102), Availability (49), Storage (25), Convenience (24), Hygiene (17), Food safety (8)	Physical Level	Hygiene (8), Availability (1), Storage (1)	
Culture (28), Food taboos (11), Social norm (4), Social practices (4)	Social Level	Culture (12), Social norm (2), Role model (2)	
Sensory preferences: taste/smell/texture (169), Hunger (38), Familiarity (30), Health (23), Body satisfaction (12), Self-reliance (10), Knowledge and Skills (6), Biological (3), Mood emotions (3), Attitudes and Beliefs (1)	Individual Level	Health (73), Body satisfaction (42), Hunger (29), Sensory preferences (12), Attitudes and Beliefs (7), Mood emotions (5), Familiarity (1), Self-reliance (1)	

Fig. 1. Driving factors of food choices of the Khwe clustered according to the ecological model (Story et al., 2008). On the left, the factors were derived from the comparison interviews, and on the right from the free listing exercise. Numbers indicate the number of times the factor was mentioned as a reason for food choice.

cultivation into semi-nomadic lifestyle, others emphasised that farming played a more substantial role in their lifestyle, they themselves and their kin actively engaged in livestock husbandry and millet farming.

Informants described a drastic change in the lifestyle and dietary practices since their youth. One respondent described his first encounter with modern foods as follows: “We ate from the bush like our ancestors, until the white people came” (Male, 58), referring to the white soldiers of the South African Defence Force (SADF). Some respondents recalled that in the period between the 1970s and 1989 when SADF recruited San men in the area, their families had been provided with food rations. An elderly woman explained that “When the SADF was here, we were eating ‘good food’: coffee with sugar, bread, with fresh milk. We were eating chicken more often. They sometimes also provided beef meat. We also received biscuits” (Female, 59). She compared those times with the present when refined maize meal became a major component of their diet. Refined maize meal (along with the occasional few cans of fish and beans) has been distributed through the governmental drought relief programme and the San feeding programme since 2005, in a rather ad-hoc manner. However, even with the food supplies of the government, along with the occasional meat distribution by the trophy hunter and the social welfare support, hunger and single food type (maize meal) diets remain a major source of concern amongst the elderly. Six elders were concerned that the most common current diseases in their community-i.e. tuberculosis, HIV, and general physical weakness - are caused by the modern diet.

Youth, in general, were characterized by the elders as uninterested, lazy, refusing to eat certain traditional foods, and more directed towards ‘the modern life’, including formal education and employment opportunities, rather than investing effort in cultural practices. That said, some elderly Khwe men stated that most young people lack the traditional management skills of the environment. This, according to the elders, is essential to ensure the provision of plant foods in the long term (e.g., proper burning times, sustainable and non-destructive harvesting methods).

In terms of environmental factors, a particular concern to many elders was the absence of veld foods that were previously abundant in the bush. They listed foods that have not been consumed for over a decade (e.g. numitara, ningava) but also foods (e.g. kiara) that were consumed only in certain years, and in very low quantities. When asked to explain this decline, some respondents shrugged their shoulders, or simply replied “only God knows”, others blamed the increased numbers of wild pigs which they compete with for the same veldfood. Others pointed to the lack of rain as the reason. Four respondents elaborated on how the instructions of the elders were no longer obeyed or practised (Table 2). In addition, the recently denied access to veld foods in the forest was discussed by many at length and with great sorrow

(Table 2).

Interestingly, 30% of the elders regard the present time as being better than the past, as the government helps them with maize meal. In addition, some elders have become inclined towards modern foods, expressing their preference for those over traditional foods. One male elder in his seventies explained how he is simply enjoying the more comfortable lifestyle: he avoids the strenuous work of hunting and gathering in a dangerous environment, and instead can just wait and rest until the government brings food or social grants. Others, in contrast, complained about the financial situation and about relatives demanding their support, which makes it difficult to purchase enough modern food items in the local shops.

Taste preferences have also changed, and many have come to value sweet and fine-textured foods over bitter and rough foods. Nonetheless, some individuals emphasised that since they are consuming these modern foods, new diseases have appeared, diseases that they lack bush medicine to cure (Table 2).

The divided reasoning of the elders about the significance of traditional foods in the present diet drove us to explore the question further among a wider age range. The free listing and comparison exercises provided a deeper insight into food choice between traditional and modern foods across generations.

3.2. Traditional and modern foods – current drivers of food choices

When asked to choose between the food pairs; “which food item is preferred and why?”- traditional food items were chosen 449 times, while contemporary food items 259 times by the 59 participants of the structured comparison exercise. Two modern foods were chosen in particularly high numbers, namely maize porridge ($n = 31$) and sunflower cooking oil ($n = 37$). All the other listed modern food items were less popular than their traditional counterparts (Table 3). The participants' reasoning for their own food choices were grouped according to the ecological model (Fig. 1) into the four different levels and are discussed below.

3.2.1. Macro-level factors

At the macro level, food choice was predominantly influenced by cost, seasonality, food aid programmes, and conservation policy. For example, several participants voiced that they do not choose veld foods anymore, as people have been excluded not only from the core conservation areas (where most of their plant foods are found) but also more recently the multiple use areas of the Bwabwata National Park. The following quote from one Khwe participant reveals his frustration regarding these regulations: “Honey is nicer, but people stopped hunting for honey because you are not allowed to move in the bush. If

you are found there, you will be arrested.” One elderly also expressed that she prefers modern foods because harvesting in the bush exposes them to dangers of wild animal attacks. These risks and the associated fear have resulted in participants preferring to rely on contemporary foods.

Seasonality also played an important role in food choices and was given by many respondents as an explanation for their selection of the modern food item instead of the traditional one, due to the former having less fluctuation in availability. Participants complained about changing rain patterns and inappropriate natural resource management practices. Other factors given to explain food preferences were freshness of the food, desirable packaging, and food labels. The nutritional information content of the labels is little understood; for many Khwe a label gives the impression that the food item is more valuable than foods without labels.

Several modern food items are offered locally at a very high price (e.g., cabbage at the local shop costs twice that in the nearest supermarket 200 km away). Such foods are regarded as unaffordable and hence not frequently chosen. More importantly, the idea of paying for food was given as a discouraging factor for the majority of the respondents. “For potato I need money to buy it, but dinga is free in the bush.” (Female, 24).

The food distribution programs were also influencing the food choices of several respondents. Most of them preferred the food items that the food aid programs provided, yet few Khwe repulsed those items that the government delivered to them.

3.2.2. Physical environmental settings

Food choices were often made at the physical level by considering availability and access to particular foods in the local food environment. In certain villages, some of the veld foods were reported as unavailable even in the right season, therefore not chosen. Then again many of the desired non-traditional foods (e.g. beef meat) and fresh and healthier foods (e.g., vegetables) are generally not physically available for village residents, as the local shops do not stock these, and the transportation fee to the nearest market town is expensive. “These are good foods, but the shops don't sell these here, and we have no money to go to the town.”, stated one female respondent (aged 50). Alternatively, traditional foods that are preservable and storable (i.e., tseu, jingere) were preferred, as their availability is extendable by weeks or even months: “you can dry and store tseu even for a year” (Male, 22).

Convenience was an important factor that the respondents emphasised when choosing between the traditional and modern food pairs. Packaged food items were preferred due to the easy and fast preparation, and because they are easily obtained from the nearby shop, as opposed to veld foods that sometimes require significant effort for harvesting and/or preparation. Agricultural foods that are obtainable from the household plot were also less chosen due to the strenuous work that is associated with these foods: “I am not farming because it is tiring work, therefore I choose maize porridge” (Female, 21).

Food hygiene as an influencing factor of food choices was mentioned mainly when referring to meat. Most respondents perceive the village environment as dirty and therefore prefer their meat from the wild or from the shops. “Village chickens eat all the dirt and rubbish around the village, while shop chicken are fed nice things” (Female, 26). Participants occasionally mentioned food safety—in reference to expired foods of vendor or government distribution. However, relative to the matters of food inaccessibility, concerns over food safety and hygiene were not prevailing.

3.2.3. Social environmental factors

Cultural food practices, such as preparing and consuming certain types of traditional foods, were commonly voiced by participants when choosing between the modern and traditional food items. “That's our traditional food, our forefathers used it already” (Female, 54). The

Khwe often refer to these as “cultural heritage” or “cultural identity”. The Khwe culture has some rules and regulations about certain foods, and some believe that when these are not obeyed, something bad may happen. For example, a participant explained: “Kiara oil is very dangerous. Children cannot consume the oil if being alone at home. If children eat it when parents are out in the bush, a snake will bite them, or another animal will attack them” (Male, 32). Similarly, in the case of tceu, some Khwe believe that one can die while asleep if this plant is consumed not in silence beforehand. Therefore, those people who experienced something adverse among their own family chose modern alternatives to these foods. That said, even these ‘risky’ traditional food items continue to be very much enjoyed and desired.

More contemporary social norms are also starting to influence peoples' food preferences. Maize meal has become central in the Khwe diet: “If you don't have that food at home, you don't have life at home” (Female, 45). Meanwhile, young people have also given up certain cultural and social practices, as this quote demonstrates: “We stopped using qom because we are not hunting after plants anymore, like our elders did” (Male, 29).

3.2.4. Individual-level factors

Participants' responses on food choices at the individual level was assigned to 10 different factors (Fig. 1.). Taste was the primary driver determining one item selection over another. Respondents often selected a modern food over a traditional one due to the latter having a bitter taste or strong smell. Others prefer the smooth and soft texture of modern foods compared to the often rough, fibrous texture of traditional foods.

References to hunger and satiation are the fifth biggest factor influencing Khwe's food choices. Many participants explained that they chose the food item that they believe fills the stomach for longer, so that they would not feel hungry for many hours afterwards, regardless of whether the selection was a traditional or modern food. One participant explained her preference for millet as follows: “It is a powerful food, as it fills your stomach for the whole day; you don't need to look for other foods that day anymore.” (Female, 48). Similarly, food items that are generally of a larger volume were preferred. On the other hand, foods that do not sustain the sensations of satiety, foods that were of smaller portions, and foods that could not feed the entire family were selected less often. Typically, the nutrition rich veld foods were too low in bulk to be considered as satiating.

Familiarity is another factor that emerged as an important determinant in the Khwe selection of foods. Several respondents explained that childhood food habits generated persistent patterns of food choices in their adulthood, which resulted in a positive association with traditional foods. That said, for some youth, certain traditional food items are unknown and therefore also not chosen, even though these are commonly consumed by the majority of the older community members. Other participants expressed their distrust and suspicion around modern food items, especially concerning canned beans, shop chicken, potatoes and sugar. These feelings were related to a lack of knowledge about where the particular food came from, how it was created, and therefore whether or not these are likely to cause sickness. One participant expressed this notion of familiarity: “We are used to dinga. We were grown up eating it but the foods from the shop - we don't know whether they give us sickness or not” (Male, 46).

Health, in general, is a motive influencing Khwe food choices. The notion of health emerged in narratives related to nutritional and healing properties of the food item (“it has vitamins”), symptoms of sickness (“they cause coughing”), protective or non-harming effects on the body (“they don't destroy the teeth”). The food items, that the participants chose because of the notion of health, belonged to both traditional and introduced foods; however, the reasoning given for the choice was depending on the food's origin. Some informants described traditional food as protecting the body, while contemporary foods were often characterized as high in protein and carbohydrates. Several young

people, for instance, referred to the nutritional list printed on the packaging of the modern food items as a reason for healthy choices. Some youth also commented on learning in school about modern fruits and vegetables being nutritious and healthy. Other participants preferred the foods that they believe make the body fat, as they regard a fat body to be healthy, while they described an unhealthy person to be thin. That said, three elderly former hunters regarded a fat body to be an impediment for enduring the long chase of the animal.

Some traditional foods are requiring specialised knowledge or skills for harvesting or preparation. This was mentioned by many of the younger respondents, as illustrated with the following: “I don't know how to open qom.” (Female, 21). Correspondingly, veld foods that require physical strength were less frequently chosen by the elderly “I cannot climb up for honey.” (Male, 82).

Other individual factors determining food choices were personal biological factors, attitudes and beliefs towards specific foods, mood and emotion linked to certain foods and self-reliance. The latter refers to the procurement of foods without depending on any outside agent (such as governmental deliveries, or trophy hunting meat distribution), but relying entirely on one's own production or foraging skills.

3.3. Perceptions of good foods

In the free listing interviews, 69 respondents listed 56 different food items that they perceived as ‘good’. Among the participants, three elderly participants refused to answer our question about ‘good foods’ because they felt they were ill-equipped to decide what is ‘good food’ and referred us to the younger generations, as the latter “are learning about good foods at the school”.

Table 4 presents a list of the 20 food items with the highest saliency. Several types of grains resulted as the most salient ‘good foods’. Maize meal was mentioned by nearly half of the respondents ($n = 28$). It is the most familiar food for the Khwe that satisfies hunger and when they access it, it is in a larger volume (12.5 kg sacks). Many referred to its ‘good nutritional quality’ as the list of containing nutrients is indicated on the packaging. Other grains that were mentioned by several participants were macaroni (pasta), that was characterized as mood uplifting and energy giving, as one of the women described it: “if you eat pasta, your heart is free, and there is no stress” (Female, 28). Several participants listed millet that “fills the stomach for the whole day” (Female, 38), while it also “can be grown by ourselves without waiting for the government to bring us food” (Male, 52). Rice and bread were regarded

as tasty and healthy.

Several veld foods were identified as good foods, and many community members who listed these described them as central to their wellness, stating that traditional food consumption was essential for avoiding illnesses: “Our elders were healthy, they were eating fresh foods. But today we are eating rotten food distributed by the government.” (Male, 49). The elders frequently referred to canned food as rotten food, distributed as food aid. Many wondered how cooked food could keep well for such a long period of time. Sugar was mentioned by one-fifth of the respondents and perceived as energy giving and mood uplifting. Most of the informants listed good foods from more than one food source, but there was a common perception that food from the shops is better in terms of hygiene and taste, as demonstrated by the following statement: “Modern food from the shops are clean foods, and taste very nice” (Male, 28). In addition, food served in the hospital was regarded as healthy and therefore ‘good’, i.e., macaroni, bread, coffee, and milk.

Overall, the free list results indicate that the Khwe prefer a mix of contemporary and traditional foods, which are most of all ‘filling’, and perceived as ‘healthy’ and ‘energy-giving’.

4. Discussion

Contemporary food choices of a former hunter-gatherer community are difficult to explain unless considered in the historical and cultural context. Therefore, by utilizing multiple qualitative methods, our aim was to enhance the integrity of our findings and entangle the complexity of the implicitly made food choices.

4.1. Historical and cultural setting

One of the key topics discussed by the elderly in the key informant interviews is the political and historical background that drove cultural and lifestyle transition and resulted in decreased utilization of traditional food systems. The era of the SADF military employments stands as an important influence in transforming the Khwe traditional food culture. Even if by some respondents this period was characterized as abundant in terms of having provisions of filling, sweet and fine-textured modern foods, it was also a time of negligence of traditional knowledge and skills related to food procurement (Table 2). This period witnessed a lack of time and opportunities to transmit knowledge to the youth, restricted movement in the bush coupled with increasing

Table 4
Saliency of the free-listed “good” foods.

Rank	Item	Saliency	Traditional (T) or Modern (M)	Food group type	Frequently mentioned positive attributes
1	maize meal	0.359	M	grain	Satiating, belief, health, social norm
2	macaroni	0.128	M	grain	Satiating, health, belief, mood, emotion
3	sugar	0.113	M	sweetener	Body satisfaction, health, mood, emotion,
4	rice	0.106	M	grain	Body satisfaction, health, mood, emotion,
5	bread	0.102	M	grain	Body satisfaction, health
6	millet	0.101	T	grain	Satiating, belief, health, culture, self-reliance,
7	qonya ^a	0.089	T	fruit	Satiating, belief, health, taste, hygiene, policy
8	milk	0.083	M	dairy	Health
9	shop chicken	0.077	M	meat	Hygiene, health
10	cabbage	0.072	M	vegetable	Health, body satisfaction, hygiene, belief
11	tseu ^a	0.066	T	seed	Culture, seasonality, belief, policy, health
12	coffee	0.066	M	beverage	Body satisfaction
13	tcinya ^a	0.065	T	fruit	Fattening, health, culture
14	qom ^a	0.061	T	nuts	Preference, culture, policy
15	maize	0.047	M	vegetable	Belief
16	dinga ^a	0.047	T	tubers	Health, culture
17	honey	0.045	T	sweetener	Health
18	cold drink	0.045	M	beverage	Satiating, energy-giving
19	wild meat	0.044	T	meat	Taste, health
20	umbe ^a	0.043	T	fruit	Culture, health

^a Local Khwedam names for traditional foods.

availability and access to modern convenient foods and alcohol. Over this period of time, many Khwe youth gradually lost the opportunity and interest to acquire traditional knowledge and practices related to food procurement and processing. Former studies have identified similar phenomena emphasising the decline in possession and transmission of traditional knowledge (Chan et al., 2006; Kuhnlein & Receveur, 1996). A significant lack of transmitted knowledge and skills amongst the Khwe youth renders foraging an unlikely livelihood option at the moment. Therefore, it comes as no surprise that several elders spoke hopelessly about the youth with regards to surviving on the land once the elders pass away. However, the situation is complex and the youth - particularly the unemployed and less formally educated - have attained at least a minimal traditional subsistence knowledge and skills set to supplement their diets with veld foods in times of need.

Meanwhile, the increasingly strict conservation measures imposed upon the Khwe have reduced the opportunities of traditional food procurement by severely limiting access to natural resources inside BNP. If the rules of prohibited access to the bush are disobeyed, Khwe risk being arrested, injured or even killed by the authorities. This has generated great distress in the whole community and prevents them from continuing with much of the veldfood harvesting. The formerly active, nature-dependent food strategy of the Khwe has shifted to a highly passive, monetary and social welfare dependent strategy.

For the elders especially, and given the current circumstances, social welfare and the governmental food distribution provide some level of food security. The pensions enable the elderly to purchase shop foods, and the governmental food distribution provides some compensation for the harder-to-forage foods. That said, the elderly generation raises and feeds many grandchildren, and contribute to the feeding of orphaned children, and thus adult relatives often expect the pensioners to share their purchased foodstuff and their pension money. Hence, often even those elders who have some financial means are not secure themselves food-wise. The practice of sharing is very deeply imprinted in Khwe culture, as in many small-scale foraging groups (Ingold, 1999, pp. 399–410). In the past, for many Khwe community members the act of sharing provided access to various traditional foods; today this has also translated to the sharing of purchased foods and income.

Periodic hunger seemed to be apparent in both the traditional and the contemporary food procurement systems. In the past, periods of starvation alternated with periods of feasting on nutritious seasonal food, and hunter-gatherers rarely suffered from signs of chronic malnutrition (Bronte-Stewart, Budtz-Olsen, Hickley, & Brock, 1960; Cohen, 1989). On the other hand contemporary biomedical studies explore favourable impacts of periodic calorie restriction on carcinogen diseases and on the pace of ageing (Hursting, Smith, Lashinger, Harvey, & Perkins, 2009; Fontana, 2009). It seems that the Khwe got used to periodic hunger, assisting them in enduring food scarcity even in the modern day and age. Yet, in the past, the Khwe stocked their body with valuable nutrients during abundant seasons, while today the dietary quality is at a significant low level (Heim & Paksi, 2019), that it does not compensate for the hunger intervals.

Kirchengast (1998) found that the transition from nomadic hunter-gatherer to settled life had negatively impacted the nutrition status of the !Kung (another San group in Namibia). While traditional food has provided them with relatively diverse diets, these have been replaced by a simplified diet containing excessive amounts of staple food and other unhealthy habits (e.g., excessive consumption of sugar and alcohol). These have largely contributed to nutritional deficiency (e.g., in iron, measured by Kent & Lee, 1992, pp. 173–199). In our study, diseases are indeed often associated with modern foods, as reported by the elderly Khwe. Alcoholism is also increasingly widespread among the Khwe, and its legacy is traced back to the era of the SADF (Taylor, 2005), yet the key informants avoided commenting on this topic.

On the other hand, many informants raised their concerns about the declining abundance of veld foods. Some complained of changing rain patterns, while others expressed their frustration of the late timing of

traditional burning practices - phenomena being both culturally and ecologically important (Humphrey, 2018). These alterations in the landscape alone are likely to cause further changes in plants distribution and impact traditional food system, as was also reported by Guyot, Dickson, Paci, Furgal, and Chan (2006). In addition, quantitative assessment is needed to confirm the current abundance of the edible plants in the BNP.

4.2. Current food choices

The Khwe have been undergoing a gradual dietary transition over the last few generations, but they still hold some traditions, cultural norms related to the food they consume. According to dietary studies with Indigenous Peoples elsewhere, consumption of traditional foods significantly improved diet quality through its rich micronutrients content (Kuhnlein & Receveur, 1996; Nakano, Fediuk, Kassi, & Kuhnlein, 2005; Sheehy, Kolahdooz, Roache, & Sharma, 2015). In addition to their nutritional importance, traditional foods have been found to enhance cultural, social and spiritual health of many Indigenous peoples (Van Oostdam et al., 2003). Therefore, maintaining traditional food in the contemporary diets of the Khwe has outstanding significance for both of their physical and mental wellbeing.

Today, however, the factors that influence Khwe food choices are showing a trend that is parting from traditional food items. While traditional foods were more frequently chosen than modern foods in the comparison exercise, in the saliency table of the free listing exercise, modern foods dominated the first five saliency ranks (Table 4). This demonstrates the complexity of food choice behaviours amongst the Khwe. To gain a better understanding of the food choices and their interactions, we have employed the ecological model by Story et al. (2008) and created a visual representation of all the twenty-nine food choice drivers at different levels that arose during our investigation for this study (Fig. 1.). According to Gissing et al. (2017), in African settings, the focus of most research has been at the individual level. The present study found that while factors at the individual level were the most significant, also factors at other levels influence and certainly co-influence food choices.

At the macro level, respondents referred to the high costs of food, similarly to other studies, highlighting the fact that finances and costs affect peoples' food decisions (Farris, Misyak, O'Keefe, VanSicklin, & Porton, 2019; Hayford, Steiner-Asiedu, & Sakyi-Dawson, 2015; Savy et al., 2008). Yet several Khwe respondents expressed their frustration about food costing money. There is a general lack of monetary capital for purchasing foods; the little income that people obtain is often targeted for covering commuting costs, mobile phone credits, blankets, and sometimes alcohol. Also historical events contributed to the objection of spending money on food. As a forager, the Khwe San's "supermarket" has been the bush for generations, where they have collected and hunted food to cover all their needs. Later, in the SADF era, when free movement in the bush got restricted, the San families received modern and canned foods for no costs from the army, which established a social norm for the preference of free packaged food. In the 1990s however, the Khwe experienced hunger as a part of everyday life. With limited external food assistance, the gathering of veld foods began to regain crucial significance (Taylor, 2012, p. 81). In the 2000s, the eradication of hunger became a top priority nationwide, and the San feeding programme began to deliver free staple food to the communities (OPM, 2011). Not surprisingly, the food item that was regarded by our respondents as the most salient 'good food' - and preferred more frequently over the traditional counterpart - was maize meal supplied by the government at no cost. These days maize meal provides the bulk of daily energy intake for the entire community (for more details on recent dietary intake see Heim & Paksi, 2019). The reliance on this modern food item has grown enormously, not only to meet physical needs but also in their psychological and social significance. Even in the absence of food deliveries, maize meal is the

preferred choice to obtain before any other food items.

Traditionally, seasonality was a significant influencer of resource availability, food sharing and diet composition (Speth, 1990), and was a phenomenon that the Khwe have managed well to live with for centuries. Yet, with the introduction of long-lasting packaged foods, and with the dominance of year-round-available maize meal, seasonality has become more of a burden regarding traditional foods. Several respondents explained that they do not want to wait for the food that comes into season: “we are hungry now”.

For the Khwe, access to food is often insecure. This explains our finding that easier-to-access foods are a top priority when choosing between two different food items. Due to conservation regulations, visits to the bush to acquire food and natural resources have gotten progressively restricted. Therefore, many expressed their preference and choice for the modern foods, yet some contemporary foods, especially fresh food, were simply not available in the local food environment. Nevertheless, traditional foods that are storable (seeds and dried foods) or even have a potential for multiplication (like beans, which can be planted) were often preferred, as they act as a safety net in periods of food shortages. Convenience was referred primarily to the effort and physical involvement that takes to access and prepare foods. Yet cost was a factor that interacted with convenience. Even if modern food from the store was convenient to prepare, the cost prevented many Khwe to buy modern foods. In case of the food assistance program, while cost was not the issue, and for the Khwe it was convenient that the free food was delivered to their communities, yet the inconsistency, food quality and long waiting time was subject to criticism. Satiation is rarely considered in the literature but appears to play a significant role in the food choices of low-income communities (Hough & Sosa, 2015). In a study by Antin and Hunt (2012), African American women were found not to spend money on healthier foods if these did not produce the feeling of satiation. Similarly, the sensation of “feeling full” after eating certain food items was found to be an important factor also among the Khwe, who regard dry beans, millet and maize porridge, but also carbonated sugary beverages, as filling foodstuffs. In addition, foods that are considered to make the body fat were highlighted as an advantage by several of the study participants, as being fat is generally regarded as a positive body image amongst the Khwe.

Cultural values and knowledge relating to procurement, preparation and consumption of traditional foods are fading at a fast pace. Cultural norms and drivers were found not to be the main factors influencing current Khwe food preferences. Many traditional skills and knowledge are no longer practised or are restrained by limitations, as explained above. This is leading towards a gradual loss of the nutritional safety net provided by traditional food consumption, which has sustained the Khwe for generations. The government's attempts to reduce food insecurity through the provision of food aid fails to respect and protect traditional diets. Kuhnlein and Receveur (1996) suggest that traditional and wild foods should be part of supporting food strategies to reduce the burden of malnutrition and to improve the well-being of Indigenous people – a proposition that also applies in the case of the Khwe.

The concept of ‘good food’ has been explored extensively in the literature, see for example Graf, 2015; Johnston, Szabo, & Rodney, 2011; Hasnain, 2018; Murcott, 1993. In Pakistan, study participants’ ‘good food’ conceptualisation was strongly influenced by the food networks of the western countries, yet still referred to reconnecting with traditional values (Hasnain, 2018). Graf (2015) found that ‘good food’ was associated with familiarity and trust. In the case of the Khwe, there was little consensus among the respondents as to what is ‘good food’. While familiarity appeared in instances when referring to culture, the three most frequently mentioned positive features of ‘good food’ items were the provision of energy, satiation and health (Table 4). References to healthiness were quite frequent, especially when characterizing grains. There seems to be a contradiction between what is conceived as filling or energy-giving and what is healthy and nutritious. For example, many young Khwe associate modern foods with ‘good food’

because of the nutrition labels on packaged foods. In contrast, because there are no labels attached to traditional foods, they do not regard these as healthy. In addition, the elderly shared their disheartened feelings regarding their ability to continue transmitting food-related knowledge and wisdom to the youth; as the elderly stated, in this modern time, the school classroom is where the learning about food needs to take place. Only a few respondents mentioned contemporary fresh vegetables and fruits among the healthy foods. While several studies have focused on the structural barriers of healthy food choices (Airhihenbuwa et al., 1996; Drewnowski & Darmon, 2005; Hargreaves, Schlundt, & Buchowski, 2002), in the case of the Khwe community, there is much misinformation or lack of information that needs to be addressed.

4.3. Limitation of the study

It lay beyond the scope of this study to explore all the historical events and the outcomes of numerous development interventions, rather we focused on the impacts of the elderly's common recordings of the past. The narrative accounts of the elders were, however occasionally difficult to place precisely in time. As we aimed to gain an overall picture of influences on food behaviour from the past periods, we did not elaborate on exact dates of the stories.

Furthermore, due to the qualitative nature of the study, we did not match the food choices and food preference characteristics to socio-economic status, another analytical tool that could bring further insights in the future.

5. Conclusion

Diets of the Khwe San in BNP East are shaped by decreased access to wild foods, previous experiences of hunger, and increased exposure of modern packaged foods – all of these resulting in food preference shifts. The main determinants of current food choices are: sensory drivers, access, hunger, costs, and health. Currently, preferences towards traditional foods subsist but are not uniform amongst the Khwe population. In times of hunger, the Khwe choose whatever food is most easily accessible to fill their stomach. Yet, in bringing a cultural and historical dimension to food choice research, our study reveals that current decisions are shaped by past events and access issues, both of which have contributed to reduced transmission of food-related traditional knowledge and skills.

Food insecurity remains the main driving factor of Khwe food choices, calling for immediate and effective solutions. Improving the access to healthier contemporary foods, increasing the nutritional value of staple food, reduction of poverty levels, and initiation of culture sensitive food production projects are some of the direct actions needed to tackle food insecurity amongst the Khwe. Nutritional education is imperative but can only make sense if undertaken hand-in-hand with guaranteed accessibility to nutritious food items. Ultimately, finding ways to ensure the availability of and access to traditional foods, as well as to support the intergenerational knowledge exchange on these, needs to be featured as priorities in any strategies promoting Khwe health, wellbeing, and food security.

Ethics approval and consent to participate

All data collected for this study involved the obtaining of a signed free, prior and informed consent form each participant participating in the study. Prior to obtaining their written consent, all participants were informed about the purpose and meaning of the study, the subsequent plans for anonymised publication of the information, the assured confidentiality of sensitive data points, and the voluntary nature of participation, including the right to withdraw at any stage from the research, without any repercussions thereof.

According to the ethical principles of research requirements of the

Finnish Advisory Board on Research Integrity, the present study did not require an ethical statement, seeing it did not involve any methods or procedures listed by the Board as requiring a thorough and in-depth ethical review. The ethical review request for this study was therefore waived by the Ethical Review Board in the Humanities and Social and Behavioural Sciences at the University of Helsinki.

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Declaration of competing interest

The authors confirm that there is no conflict of interest associated with this work.

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